UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAKI UENO, HIDEYASU NAGAI, HOICHI SUZUKI, TOMOKI FUKAGAWA and FUMINORI HIKAMI

Appeal No. 2006-0346
Application No. 09/479,267

ON BRIEF

Before GARRIS, PAK and WALTZ, **Administrative Patent Judges.**

WALTZ, **Administrative Patent Judge.**

DECISION ON APPEAL

This is a decision on an appeal from the primary examiner's non-final rejection of claims 1 through 4, which are the only claims pending in this application. Although the action appealed from was a non-final rejection, we have jurisdiction since the claims have been twice rejected. See 35 U.S.C. § 134 and *Ex parte Lemoine,* 46 USPQ2d 1420, 1422-23 (Bd. Pat. App. & Int. 1998).

According to appellants, the invention is directed to a spin-valve type magnetic resistance sensor for use in a thin-film magnetic head, where the sensor has a structure made of layers stacked as follows: an insulating layer, a first base film, a second base film, a nickel-iron film, a cobalt-iron film, a non-magnetic conducting layer, a pinned magnetic layer, an antiferromagnetic layer, a protective layer, and another insulating layer (Brief, pages 1-2).[1] Appellants state that the second base film comprises an alloy NiFeX, where X may be Cr, Nb, or Rh, with a face-centered cubic (fcc) structure and a (111) crystal plane orientation (Brief, page 3). By forming both magnetic layers, the nonmagnetic layer, and the antiferromagnetic layer of the spin valve film on top of the second base film, the crystal plane orientation is strengthened, resulting in a spin-valve MR sensor that exhibits high relative magnetoresistive change (*id.*).

Appellants state that claims 1-4 stand or fall together (Brief, page 4). Representative independent claim 1 is reproduced below:

1. A spin valve magnetoresistance sensor, comprising:

a base layer layered on top of a substrate, the base layer including a first base film having a nonmagnetic

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[1]We refer to and cite from appellants' Brief dated Dec. 17, 2003, filed in response to our Remand dated Aug. 20, 2003, Paper No. 18.

metal and a second base film formed on top of the first base film, the second base film having an alloy represented by NiFeX, wherein X includes one of Cr, Nb and Rh, the second base film having a face-centered cubic (fcc) structure and a (111) orientation;

a pair of magnetic layers enclosing a nonmagnetic layer layered on top of the base layer; and

an antiferromogmanetic layer adjacent to one of the pair of magnetic layers.

The examiner has relied up on the following references as evidence of obviousness:

Aoshima et al. (Aoshima)	6,046,892	Apr. 04, 2000
Iwasaki et al. (Iwasaki)	6,157,525	Dec. 05, 2000

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Aoshima in view of Iwasaki (Answer, page 3).[2] Claims 1-4 are also rejected under 35 U.S.C. § 103(a) as unpatentable over Aoshima alone (Answer, page 4). We *reverse* both grounds of rejection on appeal essentially for the reasons stated in appellants' Brief, Reply Brief, and for those reasons set forth below.

OPINION

A. The Rejection over Aoshima alone

The examiner finds that Aoshima discloses a spin valve

[2]We refer to and cite from the examiner's Answer dated Dec. 17, 2004.

magnetoresistance (MR) sensor (20) including a base layer (21, 22) layered on top of a substrate (not shown), where the base layer includes a first base film 21 formed of a nonmagnetic material (e.g., Ta) and a second base film 22 formed on top of the first base film from a NiFeX alloy, with X selected from Cr, Nb and Rh (Answer, pages 4-5). The examiner finds that an fcc structure is inherent to the NiFeCr layer since Aoshima teaches that the PdPtMn layer has a fcc structure, and operation would not be possible if the NiFeCr and Ta underlayers did not also have a fcc structure (Answer, page 5).

The examiner recognizes that Aoshima is "expressly silent" as to the NiFeCr base layer having a (111) crystal plane orientation (Answer, page 5). However, the examiner concludes that it would have been obvious to one having ordinary skill in this art at the time of appellants' invention to have provided the NiFeCr base layer of Aoshima with a fcc structure and (111) orientation since such a structure and orientation is "known to have a highly orientated [sic] crystal structure while no magnetic anisotropy appears in this orientation" and "such orientation is the closest packed orientation, i.e., most stable" (*id.*). The examiner states that these favorable characteristics would have been realized by a "skilled artisan" who desires to obtain "good soft magnetic characteristics" (*id.*).

Appellants do not contest the examiner's factual findings based on Aoshima except for their argument that Aoshima does not disclose or suggest forming a NiFeCr underlayer having the specific fcc crystalline structure and the specific (111) crystalline orientation (Brief, page 5). As correctly argued by appellants (Reply Brief, page 3), in cases where the examiner relies upon "common knowledge" or what was "known" in the art, the examiner must support such allegations with evidence or technical reasoning on the record. *See In re Lee*, 277 F.3d 1338, 1344-45, 61 USPQ2d 1430, 1434-35 (Fed. Cir. 2001). On the record in this rejection, the examiner has failed to substantiate by evidence or technical reasoning the statements (1) that the fcc structure in a (111) orientation is "known" to have a "highly orientated [sic] crystal structure" with no magnetic anisotropy; and (2) "such orientation is the closest packed orientation, i.e., most stable" with "good soft magnetic characteristics" (Answer, page 5; see also page 6). Therefore we cannot sustain

the rejection of claims 1-4 under section 103(a) over Aoshima alone.

B. The Rejection over Aoshima in view of Iwasaki

The examiner presents the same findings from Aoshima as discussed above (Answer, page 3). The examiner applies Iwasaki for the disclosure that "NiFeCr has an [sic, a] fcc structure and (111) orientation (see col. 8, lines 32-36)." The examiner further finds that this fcc magnetic film of Iwasaki "promotes the fcc(111) orientation" and thus provides a large resistance change ratio due to the smooth surface and soft magnetization (Answer, page 4). From these findings, the examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of appellants' invention "to have provided the above NiFeCr film to have had a fcc structure and (111) orientation" as taught by Iwasaki for its advantageous properties (*id.*).

To establish a prima facie case of obviousness over a combination of prior art references, it is incumbent upon the examiner to show a reason, suggestion or motivation for the proposed combination, as well as a reasonable expectation of success if the proposed modification was made. *See In re Vaeck,* 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). Iwasaki is directed to a spin valve type MR film (col. 2, l. 38-41) where the underlayer film is composed of two base films, *both* of which are *magnetic* (see col. 8, ll. 30-36; col. 18, ll.

43-54; and Figure 27). This differs from the "conventional" spin valve film, discussed by Iwasaki and shown by Aoshima, where a *non-magnetic* underlayer such as Ta is used (Iwasaki, col. 8, ll. 22-27; Aoshima, Figure 5 and col. 2, ll. 27-29). Iwasaki specifically teaches the problems associated with the conventional non-magnetic (Ta) underlayer spin valve films (col. 8, ll. 22-29). As correctly argued by appellants (Brief, page 6; Reply Brief, page 5), the teachings of Iwasaki are only directed to the desired crystal structure and orientation that is "promoted" by a fcc magnetic film which is on top of another magnetic film. Accordingly, we determine that the examiner has not established why one of ordinary skill in this art would have applied the teachings of Iwasaki, directed to a base layer with two magnetic base films, to the conventional spin valve film of Aoshima with a non-magnetic underlayer or base film of Ta. We also determine that the examiner has not established that one of ordinary skill in this art would have had a reasonable expectation of success, i.e., achieving the desired properties, in modifying a conventional spin valve film with a non-magnetic underlayer such as disclosed in Aoshima with the teachings of Iwasaki for the crystalline structure and orientation of a magnetic underlayer or base film.

For the foregoing reasons and those set forth in the Brief and Reply Brief, we determine that the examiner has not

established a *prima facie* case of obviousness in view of the reference evidence. Therefore we reverse the rejection of claims 1-4 under section 103(a) over Aoshima in view of Iwasaki.

C. Summary

The rejection of claims 1-4 under 35 U.S.C. § 103(a) over Aoshima is reversed. The rejection of claims 1-4 under 35 U.S.C. § 103(a) over Aoshima in view of Iwasaki is also reversed.

The decision of the examiner is reversed.

REVERSED

BRADLEY R. GARRIS)
Administrative Patent Judge)
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) BOARD OF PATENT
CHUNG K. PAK) APPEALS AND
Administrative Patent Judge) INTERFERENCES
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THOMAS A. WALTZ)
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